PHILADELPHIA NEUROLOGICAL SOCIETY.

February 24, 1903.

The President, Dr. H. A. Hare, in the chair.

The Changes Found in the Central Nervous System in a Case of Rabies.—This paper was read by Dr. C. L. Allen. (See page 280.)

Dr. D. J. McCarthy said he had examined some of the sections from this case, and the lesions were minor as compared with those found in the dog, and were much less than those which he had seen in three other cases in the human being. In the present case, however, the inoculation experiments rendered the diagnosis positive. The presence of lesions in the cells of the capsules in the spinal ganglia in a case like this, with a history of alcoholism, would not be sufficient to render the diagnosis certain. The clinical symptoms in the case reported were not those of hydrophobia. In the three cases that he had seen there had been prodromal symptoms, followed by fever with a temperature of 103 deg. F., and symptoms of bulbar irritation. There was no special fear of water, but when the attempt to swallow was made the spasm would start in the throat and extend to the neck muscles, and afterwards to other parts of the body. In the interval there was depression. After a day or two delusions developed, and the case went on rapidly with heart failure and death. In none of the human cases was there the paralysis which is rather typical in the lower animals and which is of an ascending type.

Dr. William G. Spiller said that he had examined the specimens from Dr. Allen's case, and that the lesions were those which are found in many infectious diseases. He thought that it was quite possible that in this case the symptoms were modified by the condition of alcoholism. From the results of the experimental work he thought it probable that this was a case of rabies.

He called attention to some observations which he had made a year or two ago. At that time only one or two investigators had referred to similar lesions in any condition except rabies. These lesions have since been found in other diseases than rabies.

Dr. William Pickett referred to the mental aspects of these cases. There is no insanity of rabies. Rabies, like other infectious diseases, is commonly accompanied by delirium. This begins in the prodromal stage, grows violent in the stage of maximum intensity, and in the third, or paralytic stage, subsides.

In the past year three cases have been admitted to the detention wards at the Philadelphia Hospital as cases of rabies. Two of these were young men with hysteria major, the third an imbecile girl, who "barked like a dog," though never bitten. The men had both been bitten, and later had become addicted to alcohol as a result of morbid fear of developing hydrophobia. In both cases he attributed the hysteria major to the alcoholism superimposed upon the nervous excitement set up by the fear of the disease. This mental excitement is preferably spoken of as delirium instead of as mania. His own view was that in Dr. Allen's case the delirium of alcoholism and of hysteria was mingled with that of rabies. The symptom of barking like a dog, and the fact that the patient became lucid for a time, would support this view.

Dr. H. A. Hare asked whether the occurrence of posterior paralysis, coming on in the animal after inoculation, were of positive diagnostic value. His own experience with animals was that many poisons, when injected, are likely to produce posterior paralysis. In 1888 he had seen at the Brown Institution in London the deer sent from the Queen's preserves in Richmond Park for study. They developed posterior paralysis, but only after several days of delirium, in which they were mad, biting at their cages, acting in a manner quite opposite to their normal character. He raised the question, whether or not posterior paralysis without other symptoms possessed much value as a diagnostic aid in determining the presence of rabies.

Dr. Charles Lewis Allen said that in the case reported the clinical history was very fragmentary, and that he had not himself had an opportunity of examining the patient. With regard to the ascending paralysis, he had simply accepted the report of Dr. Ravenel, who had not entered into any details but stated that the clinical picture presented by the inoculated rabbits was typical of rabies.

A Case of Traumatic Facial Paralysis Treated by Nerve Anastomosis. A Preliminary Report.—Dr. Harvey Cushing, by invitation, reported this case. The patient, a young man of thirty, was brought to the Johns Hopkins Hospital, March 29, 1902, having received a bullet wound posterior to the right ear, destroying the mastoid process, middle ear, and paralyzing the facial nerve. Six weeks later an effort was made to restore function in the paralyzed muscles by anastomizing the paralyzed nerve with the spinal accessory, whose motor territory was sacrificed for this purpose, the nerve being divided *in toto* and brought into relation with the main trunk of the injured facial.

By the middle of August (95 days after the operation) the patient was found to have regained considerable control over the facial muscles. The movements at that time, however, were not coordinated, and were occasioned chiefly in association with volitional movements, which called the trapezius and sternomastoid into play. Thus, for example, shrugging the shoulder or elevating the arm as well as rotating the head to the opposite side would produce a general, though not a pronounced, hemilateral contraction of all the facial muscles.

Soon, however, coordinate action of the facial muscles began to be appreciable, so that for instance the eye could be closed fairly well, or the lips puckered in an effort to whistle without calling forth associated shoulder movements or contraction in the other muscles of the face.

In October (168th day) faradic response was obtained for the first time in the facial muscles on direct stimulation. Not, however, until the 207th day was it found possible to elicit contractions from stimulation of the nerve.

At present, nine months after the operation, the response from both direct and indirect stimulation of faradic and galvanic currents is practically equal on the two sides, the only difference being an anatomical one, namely, that the point from which stimulation of the nerve could be produced on the operative side was two or three cm. lower than on the normal side, owing to the dislocation of the nerve by the operation. The paralysis of the face at this time in repose is practically unrecognizable. On volitional effort the eyes can be closed and the mouth moved with almost complete symmetry. The associated facial movements, when the shoulder (trapezius) and head (sternomastoid) are vigorously moved, still persist.

So far as Dr. Cushing was aware, this operative procedure has only been twice described in literature. The first case was that operated by Faure in 1898, 18 months after the facial had been paralyzed by injury. The result was unsuccessful, probably owing to the long duration of the injury. The second case was operated upon by Kennedy, who intentionally divided the facial nerve for spasmodic tic and made an anastomosis with a result, which corresponds in all respects to that which has followed in Dr. Cushing's case. In consideration of the distressing and obtrusive deformity, which is resultant to paralysis of the N. facialis, it is a matter of some surprise that more attempts have not been made to restore function in these cases by following the lead which Faure's description must have given.

The most interesting feature of this transplantation of nerves lies in the physiological consideration of the nerve mechanism, which recovery brings into play. In what way do volitional impulses, traveling over a new path to the motor territory whose original central connections have been severed, reach this territory? The answer to this question must necessarily remain conjectural until experimental observations on the higher apes have helped to solve its complexities. Several theories are worthy of consideration. It is possible, on the one hand, that the cortical centers concerned in shoulder movements and in rotation of the head may in the course of time be educated by long training so as to coordinate the impulses which have been sidetracked by way of the N. accessorius into the facial territory. On the other hand, cortical centers originally presiding over movements of the face may continue to play a part in the coordinate action of these muscles, possibly by influencing the higher neurones connected with the N. accessorius through the intermediation of connecting cortical tracts. It is possible also that new centers may be developed, though this would hardly be expected to take place after adult life.

The study of Dr. Cushing's case has made it seem probable that volitional and coordinate movements have, so to speak, been superimposed upon the incoordinate movements of the face, which first appeared during recovery in association with the action of those motor territories in which the trapezius and sternomastoid were normally concerned. Dr. Cushing's impression consequently was that there has been an education of the connecting fibers of the cortex between the facial centers and those associated with shoulder movements, so that the original facial centers have in the course of time assumed the function, to a certain extent, of governing these movements, the impulses reaching the face by way of the paths from cortex to spinal accessory centers in the upper part of the cord, and thence to the face by way of the transplanted nerves.

Anastomosis of the Seventh and the Spinal Accessory Nerves for Traumatic Facial Palsy.—Dr. W. W. Keen reported this case. E. C., age twenty-one, Camden, N. J., was admitted to the Jefferson Medical College Hospital November 17, 1902, with facial palsy. Four weeks before admission he was struck with a glass bottle, which broke as it struck him, and inflicted a deep incised wound, 4 cm. long, in front of the left ear. Immediate paralysis of the left side of the face occurred. The wound suppurated, but finally healed just before his admission.

Operation November 26.—Dr. Keen made an incision in the old scar and with great difficulty, owing to the fibrous tissue, was finally able to identify the seventh nerve in the upper part of the incision about at the level of the external auditory meatus. This was undoubtedly only the upper part of the nerve. He could not find the main trunk. He then extended the incision down to and along the anterior border of the sterno-cleido-mastoid, lifted the muscle and discovered the spinal accessory almost at its posterior border. At this point it bifurcated, one branch entering the sterno-cleido, the other passing to the trapezius. On measuring the distance from the nearest point where the nerve could be turned upward to anastomose with the facial, he found that the main trunk would be too short and would not reach the seventh. Accordingly he made a second incision at the posterior border of the sterno-cleido, laid bare the branch to the trapezius, divided it and brought it under the sterno-cleido forward and attempted to anastomose it with the seventh nerve. It was still too short. He was, therefore, obliged to split the spinal accessory toward its root for about 3 cm. This gave him a long enough piece of the spinal accessory to anastomose with the facial, which was accomplished without any tension. In order to identify the facial, he used the faradic battery, using the indifferent electrode on the shoulder and a copper wire electrode to find the nerve. At no time was he able to produce any contraction of the facial muscles by means of a current strong enough to make contractions of the shoulder. This added materially to the difficulties of the operation, for the nerve could be recognized only by its appearance and anatomical relations.

The patient made a perfectly smooth recovery and was discharged December 3, with instructions to report to the Neurological Department for electrical treatment of the muscles.

He has never presented himself for treatment. His present condition on February 21, 1903, is unchanged from what it was before the operation.

Two days after the operation Dr. Alfred Gordon made the following report as to the condition of the muscles.

Galvanic Current.—M. frontalis—-No. RD, but the response is weak. M. orbicul. palpebr.—The CaCC is but slightly stronger than AnCC. M. levator labii super. alaeque nasi—Same. M. levator labii super and MM. zygomatici—No response to anode or cathode. M. levator menti—The CaCC is but slightly stronger than AnCC. M. buccinator—Normal, but feeble reaction. M. sterno-mastoid—Feeble reaction, but no RD. M. trapezius—Same.

Faradic Current.—M. frontalis—Very feeble response. M. orbicul. palpebr.—Response hardly perceptible. M. lev. labii sup. alaeque nasi—No response. M. lev. labii sup.—No response. MM. zygomatici—Response hardly perceptible. M. levator menti—Reaction very feeble. M. trapezius—Reaction very feeble.

Conclusions.—The MM. trapezius and sterno-mastoid are markedly impaired in their nutrition, but as yet do not present the typical RD. The M. buccinator also does not present the typical RD, but its faradic contractability is totally lost; the latter circumstance makes the prognosis unfavorable for this muscle. The MM. levators labii and zygomatici do not respond at all to either current. The M. orbicularis palpebr. presents the beginning of RD. The M. frontalis is in better condition than the others.

Dr. William G. Spiller said that astonishing as was the return of function after anastomosis of nerves, it was not quite so surprising if it were remembered that when a motor nerve is divided and immediately reunited, there is not a reunion of the same fibers, but that different fibers united so that other nerve cells were brought into association with the nerve fibers.

The question, asked by Dr. Cushing, whether or not there will be degeneration of the central system of nerve fibers after lesion of the peripheral system, depends very much upon the age of the animal. In a young animal if the peripheral system of nerve fibers is destroyed the central portion of the system atrophies or does not develop as it otherwise would. If, however, the animal is well developed and an adult the change does not take place to the same extent.

The question as to whether the operation done by Dr. Cushing is advisable or not is much easier to decide where the facial nerve has been cut, than it is in cases where there is facial paralysis, as from cold. In severe cases of this type, even where the reactions of degeneration are marked, there is often some return of power. In such a case, Dr. Spiller thought that it would be wise to wait at least three or four months before deciding to operate, but it must be remembered that in these cases of nerve anastomosis the prognosis depends very much upon whether or not the injury is recent.

Nerve Anastomosis in a Case of Anterior Poliomyelitis.—In this connection Dr. Spiller and Dr. J. K. Young exhibited a patient with infantile spinal paralysis on whom Dr. Young had performed nerve anastomosis. The patient was a child in whom the anterior tibial muscle alone was paralyzed, this paralysis being the result of anterior poliomyelitis.

The operation having been decided upon, the most important feature was the route to be selected. From a careful dissection personally made, Dr. Young decided that the lateral route was the better one, and accordingly an incision 10 cm. in length was made downward from the head of the tibia in the long axis of the leg. The incision included the skin and superficial fascia. The deep fascia was divided upon a groove director, exposing the peroneal nerve. The nerve was followed down, and by separating the peroneus longus muscle three divisions were found, (1) the fasciculus of the nerves supplying the upper part of the anterior tibial muscle, (2) the anterior tibial nerve, (3) the musculo-cutaneous nerve, these divisions corresponding to those found in the cadaver. It was decided to take the upper division, of which there were four or five fasciculi, and perforating the external division, the musculo-cutaneous, the former were united to the outer side of the latter by fine catgut sutures.

Great care was taken not to injure the musculo-cutaneous nerve any more than necessary, and the fasciculi of the nerves which supply the anterior tibial muscle at its upper part were pushed through the incision in the external musculo-cutaneous nerve without any attempt being made to separate the nerve fibers from the sheath. Small instruments were used, and the nerves were handled as little as possible.

The nerves which were anastomosed were divided as high up as possible, so that there would be no tension upon them. The deep facia was not closed with sutures. The skin was united by interrupted sutures. Over the antiseptic dressing a plaster of Paris cast was applied to insure fixation of the limb.

At the time of presentation improvement in the action of the anterior tibial muscle was observed.

Myokymia of One Side of the Face.—Dr. Spiller reported a case of this kind in which the movements were confined to the left side of the face. Bernhardt had reported a case of constant fibrillary tremor affecting the left side of the face. A similar case had come under Dr. Spiller's observation. These were the only two cases that Dr. Spiller knew of.

Dr. A. A. Eshner remarked that while it was not so difficult to understand how in Dr. Cushing's case facial motor impulses, originating in the cortical motor centers, could be carried through the spinal accessory nerve, it was most difficult to comprehend why spinal accessory impulses should not be transmitted to the peripheral distribution of the facial nerve. It seemed to him that observations on nerve anastomosis, like that reported, threw some light upon the case recorded by Drs. Harte and Stewart of complete severance of the spinal cord by a bullet, in which immediate union by suture was followed after a time by a notable restoration of motor and sensory function.

A Case of Primary Neurotic Atrophy.—This case was reported by Dr. Alfred Gordon. (See p. 354.)

Dr. F. X. Dercum said that the remarkable point about this interesting case was the condition of the eye-ground and the nystagmus. It was an interesting question whether or not the toxic history played a rôle in the eye-ground changes.

Dr. Charles K. Mills said that the case looked like some that he had seen where there was association of progressive muscular atrophy with tabes, although the tabetic symptoms were not in this case thoroughly developed.

Dr. Charles W. Burr thought that it was not wise to attribute the condition in this case to the excessive use of tea or coffee. This excess is very common while the disease in question is very rare. It was his opinion that it had never been proven that the use of tea produced any organic change in the nervous system. It seemed to him that Dr. Gordon's patient had disease not only of the peripheral nerves but also, at least, of the anterior horns of the spinal cord, and possibly also of the posterior part of the spinal cord.

Dr. Spiller remarked that the symptoms in Dr. Gordon's case had some resemblance to those of interstitial, hypertrophic and progressive neuritis of childhood of Dejerine and Sottas, and yet the case was lacking in some of the essential features of this disease.

Dr. Alfred Gordon called attention to the fact that in reporting the case he had simply stated that it was one in which there was excessive indulgence in tea and coffee, but he had not said that this was the cause of the symptoms. He had reported in 1891 a case of tea intoxication with spinal symptoms. It might be that as result of this intoxication the nervous system was predisposed to various affections.

With regard to diagnosis he had called attention to the fact that the case was not of the classical type, that it was a mixed case. It shows how difficult it is at times to classify the progressive muscular atrophies.